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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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EXAMINER

ART UNIT	PAPER NUMBER
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2814

DATE MAILED:

08/03/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

08/915,658

Applicant(s)

TRIVEDI, JIGISH D

Examiner

Ginette Peralta

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- 1) ☒ Responsive to communication(s) filed on 16 May 2000.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 31-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 31-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☐ received.
2. ☐ received in Application No. (Series Code / Serial Number) _____.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 31 to 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Okamoto (U.S. Pat. 4,910,578).

Okamoto teaches in Fig. 4D an interconnect comprising a composite structure comprising a first metal silicide 4, a second metal silicide 8, and an intermetallic compound 30 comprising metal from the first metal silicide and metal from the second metal silicide; the first metal silicide and the second metal silicide each comprises a refractory metal selected from the group consisting of molybdenum, tantalum, titanium, and tungsten; and on one of the embodiments the interconnect comprises titanium silicide as the first metal silicide and tungsten silicide as the second metal silicide.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 35 to 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto (U.S. Pat. 4,910,578) in view of Shepard (U.S. Pat. 5,227,333).

Okamoto teaches an interconnect over a substrate assembly having at least one semiconductor layer that comprises a composite structure comprising a first refractory metal silicide, a second refractory metal silicide, and an intermetallic compound comprising refractory metal from the first refractory metal silicide and refractory metal from the second refractory metal silicide, the first refractory metal being different from the second refractory metal.

Okamoto does not show a field effect transistor having a source, a drain and a gate, formed in the semiconductor layer.

However, Shepard shows a local interconnect for connecting source, drain or gate of a field effect transistor to another active area within a substrate assembly, the local interconnect comprises a composite structure that includes a plurality of metal silicide layers.

Therefore, it would have been obvious to one of ordinary skill in the art to connect a source, drain or gate to another area within a substrate assembly as taught by Shepard with an interconnect with a composite structure as the one taught by Okamoto in order to obtain a reliable interconnect that provides a good electrical contact to silicon and does not further react with the device contact region.

Furthermore, memory arrays are well known to be LSI circuits as discussed in Okamoto.

Response to Arguments

5. Applicant's arguments filed 5/16/00 have been fully considered but they are not persuasive.

With regards to Applicant's argument that Okamoto teaches a semiconductor device comprising a metal silicide film that is a single-layer ternary silicide film, the Applicant is directed to Col. 5, lines 55-61, where Okamoto teaches that one of the embodiments include a metallurgical reaction that takes place only in an interface portion between the titanium silicide film 4 and an molybdenum silicide film, thereby leaving an unreactive titanium silicide film 4 (ie. first metal silicide), a $Ti_xMo_ySi_z$ film 30 (ie. intermetallic compound), and an unreactive molybdenum silicide film 8 (ie. second metal silicide), thus an intermetallic compound is indeed formed in the invention of Okamoto.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ginette Peralta whose telephone number is (703)305-7722. The examiner can normally be reached on Monday to Friday 8:00 AM-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703)306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

GP

July 28, 2000


OLIK CHAUDHURI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800